

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
4 April 2002 (04.04.2002)

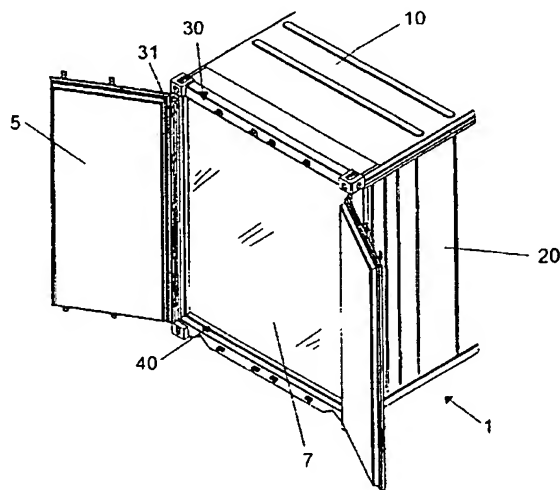
PCT

(10) International Publication Number
WO 02/26594 A1

- (51) International Patent Classification⁷: **B65D 88/14**, 90/08 (74) Agent: **HOFMAN-BANG ZACCO A/S**; Hans Bekkevolds Allé 7, DK-2900 Hellerup (DK).
- (21) International Application Number: **PCT/DK01/00620** (81) Designated States (*national*): AE, AG, AI., AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EC, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (22) International Filing Date:
28 September 2001 (28.09.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
PA 2000 01443 29 September 2000 (29.09.2000) DK (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant (*for all designated States except US*): **MÆRSK CONTAINER INDUSTRI AS** [DK/DK]; Bjerndrupvej 47, DK-6360 Tinglev (DK).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): **HOLST, Preben** [DK/DK]; Sundgade 82, DK-6320 Egernsund (DK). Published: — with international search report

[Continued on next page]

(54) Title: A FREIGHT CONTAINER



(57) Abstract: The invention relates to a freight container (1) having sides (10, 20) oriented perpendicularly to each other and defining an internal cargo space, and having a rectangular access opening which allows access to said cargo space, said access opening being surrounded by straight sections of a groove (43), said sections being oriented perpendicularly to each other, said groove (43) extending in a plane which is substantially parallel with the access opening, said freight container (1) having separate groove connection devices (50) with a groove (51) which has a cross-sectional shape corresponding to the groove (43), and which forms a continuously extending smooth transition between two adjoining sections of the groove (43). The invention is characterised in that the groove connection devices (50) comprise engagement means that are shaped complementarily to the groove (43) and adapted to provide a mechanical engagement with two adjoining sections of the groove (43).

WO 02/26594 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A freight container

The present invention relates to a freight container having sides oriented perpendicularly to each other and defining an internal cargo space, and having an access opening allowing access to said cargo space, said access opening being surrounded by substantially straight sections of a channel-shaped first groove, said sections being oriented perpendicularly to each other, said groove extending in a plane which is substantially parallel with the access opening, wherein said freight container has separate groove connection devices with a groove having a cross-sectional shape corresponding essentially to the first-mentioned groove and which forms a continuously extending, smooth transition between said sections of the groove.

Such a container is already known, wherein straight sections of a groove are formed on the internal surface of the horizontal and vertical elements in a frame that encloses an access opening at the end of the container. The groove connection devices are secured by welding to the frame and thereby enable attachment of a film across the access opening, the edges of the sheet being inserted into the groove for subsequent fixing by means of a flexible plastics strip that is pressed into the groove. By means of the groove connection devices it is possible, in a simple manner, to ensure a tight connection between the film and the groove at the inner corners of the container where the straight sections of the groove meet. Because of the smooth transition, the plastics strip, which has a shape adapted to the cross-section of the first groove, may thus be received in a continuously

extending, annular groove that has a uniform cross-section, without being given sharp bends.

However, this prior art solution presupposes that the
5 groove connection devices are made of a weldable material.

For long it has been a wish to manufacture the groove
connection devices in an inexpensive manner, preferably
10 such that the groove connection device can be replaced
without further ado. In accordance with the invention
this problem is solved in a particularly simple manner by
the groove connection devices comprising engagement means
that are shaped complementarily with the groove and
15 adapted for providing a mechanical engagement with two
adjoining sections of the groove. The groove connection
device can made of eg a plastics material.

It is particularly preferred that the groove connection
20 devices have a groove that forms a curved transition
between the straight sections.

According to a particularly advantageous embodiment of
the invention, the groove connection devices comprise a
25 first part adapted to be engaged with the first groove
and a second part adapted to prevent subsequent removal
of the first part from the groove, and locking means for
allowing releasable retention of the second part relative
to the groove.

30 The groove connection device being in releasable
engagement with the groove on two adjoining sides enables
replacement of damaged groove connection devices.

In those cases where the groove is formed with an approximately symmetrical cross-section for the sake of the attachment of the strip, the groove connection devices may advantageously be formed as featured in claim
5 7.

Further, advantageous embodiments of the invention are defined in the dependent claims.

10 The invention will now be explained more fully below with reference to the embodiment shown in the drawing.

Fig. 1, seen from the access opening, shows part of a freight container which is sealed by a sheet that extends
15 across the access opening,

Fig. 2 shows a horizontal cross-sectional view through the left vertical frame of the freight container in fig. 1, in the area at the access opening,
20

Fig. 3 shows a detailed view of the joint between two frame elements that are incorporated in the freight container shown in fig. 1,

25 Fig. 4 shows a partially exploded view of the corner joint shown in fig. 3, and

Fig. 5 shows a vertical cross-section through the joint shown in fig. 3.

30

In fig. 1, the reference numeral 1 shows the end of an elongated freight container that is, in the embodiment shown, preferably provided with a cooling device (not shown) for establishing a desired temperature interiorly

of the freight container. The freight container 1 has sides in the form of parallel and vertical walls 20, a horizontal bottom, a horizontal ceiling 10 and an end wall (not shown). In the example, the freight container 1 has two annular vertical frames 30, 40 at the shown end that combine to define an access opening to the freight container 1. This access opening may be closed by means of doors 5 that are secured to the outer frame 30 of the two frames by means of hinges 31, the other frame 40 of the two frames being arranged internally in the first-mentioned frame 30.

The doors 5, together with the sides 10, 20 and the end wall, are preferably provided with a suitable insulation for maintaining the desired temperature in the interior of the freight container. Furthermore, the freight container 1 is provided with a flexible plastics sheet 7 that extends across the access opening and that greatly seals the atmosphere in the freight container 1 from the outside when the doors 5 are closed, in a conventional manner.

Fig. 2 shows an enlarged view of a horizontal cross-section through the one vertical wall 20 of the freight container 1, more particularly the wall that is not visible in fig. 1. It appears that the wall 20 has an outer cladding 22 and an inner cladding that has a surface 24 directed towards the interior of the freight container 1. An insulating material 26, preferably a foamed material, is arranged between the outer cladding 22 and the inner cladding. A vertically extending element 32 of the frame 30 is connected with the outer cladding 22 via a weld 21, and the inner cladding is connected via a weld 25 to a vertical frame element 41 that is incorporated in the

frame 40. It will be appreciated that the figure merely represents a preferred embodiment where the two frames 30, 40 are movably interconnected by a gasket 33, as is described in European Patent No. 731 768 which is hereby
5 incorporated in the present text by way of reference.

Fig. 2 moreover shows that the surfaces facing inwards towards the interior of the container 1 are formed with an elongated channel-shaped first groove 43 that is
10 defined outwardly by two locking flanges 45, 46. The locking flanges 45, 46 define a longitudinal access passage to the groove 43 that, as shown, expands immediately behind the locking flanges 45, 46, and preferably converge again in a direction towards the
15 bottom of the groove 43. As shown, the groove 43 may be formed integrally with the frame element 41 in the internal frame 40 and preferably extends uninterruptedly around the entire access opening. Alternatively, the groove 43 may be formed in the inner cladding at a de-
20 sired distance from the access opening, or the groove 43 may be formed in the frame 30, e.g. if an internal frame 40 is not used. Further, if desired, the groove may be formed such that the access passage is oriented in a direction toward the access opening.

25

As shown, the groove 43 serves to fix the edge 7' of the above-mentioned sheet 7 in the access opening in a conventional manner, there being used a flexible strip 8 of a plastics material for this purpose which is pressed
30 into the groove 43 after insertion of the edge 7' in the groove 43. The shape of the groove 43 behind the locking flanges 45, 46 may be selected to facilitate this pressing-in. The strip 8 preferably has a length corresponding to the perimeter of the access opening, and the strip 8

may be pulled out to release the sheet 7 when access to the interior of the freight container 1 is desired.

Fig. 3 shows an inner corner of the frame 40, where the
5 vertical frame element 41 shown in fig. 2 is connected,
e.g. by welding, to a corresponding horizontal frame
element 41' which is intended to be connected with the
bottom of the freight container 1. It will be seen that
the two frame elements 41 and 41' are interconnected via
10 a groove connection device 50, which may be adapted to
impart a certain rigidity to the joint of the frame ele-
ments 41, 41'. More particularly, the groove connection
device 50 is secured to the groove 43 in a releasable
manner, and at the top the groove connection device 50
15 has a curved groove 51 which is shaped so as to form a
continuous transition between the groove 43 extending on
the vertical frame element 41 and the groove 43 extending
on the horizontal frame element 41'. More particularly,
the second groove 51 has essentially the same profile as
20 the groove 43, and the groove connection device 50 may
thus receive the sheet 7 and the strip 8 at the shown
joint. It appears that, according to the shape of the
groove 43, the locking flanges 45, 46 in the frame ele-
ments 41, 41' may also be provided with recesses 49
25 which, to a greater extent, allow unobstructed insertion
of the strip 8 at the transition between the groove 43 in
the frame elements 41, 41' and the groove 51 of the
groove connection device 50. Because of the curved
expanse of the groove 51 it is ensured that the strip 8
30 is not given a sharp bend.

In fig. 4, the groove connection device 50 is shown in
greater detail, and it appears that the groove connection
device 50 is composed of three separate parts, viz. a

first part 52, a second part 65 and a third part 60. Each of these parts has a through hole 53, 66 and 61, respectively, and the three parts may be interconnected by means of a transverse pin (not shown) that may be passed
5 through the holes 53, 61 and 66 when the parts are arranged side by side as shown in fig. 3. Each of the parts 52, 65 and 60 has a curved side edge, and these curved side edges together form the curved upper groove 51 of the groove connection device 50. The first part 52
10 and the third part 60 are provided with hook-like projections 54, 62, by means of which these parts may be caused to engage the groove 43, and with locking flanges 45', 46' of a shape corresponding to the shape of the locking flanges 45, 46 of the groove 43. The hook-like
15 projections 54, 62, which will be seen more clearly in fig. 5, are arranged along each of the two edge sides of the parts 52, 60 that extend along the vertical frame element 41 and the horizontal frame element 41', respectively. The first part 52 and the second part 60
20 may moreover be provided with incisions that serve the same purpose as the recesses 49.

In fig. 5, the groove connection device 50 is shown in the mounted state, where the groove connection device 50
25 is kept engaged with the groove 43 on the horizontal frame element 41' as well as the vertical frame element 41. It will be seen here how the locking hooks 62, 54 on the first part and the third part, respectively, of the groove connection device 50 are engaged with the locking
30 flanges 45, 46 that define the horizontal and the vertical groove 43 outwardly.

The mounting of the grove connection device in the groove 43 is more particularly carried out in that the first

part 52 is inserted into the groove via the access passage between the locking flanges 45, 46 and are moved laterally, such that the locking hook 54 of the part engages the rear side of the locking flange 45 of the groove 43, both in the vertical frame element 41 and in the horizontal frame element 41'. The third part 60 is inserted into the groove 43 in a corresponding manner. Then, the second part 65 of the groove connection device 50 is inserted into the space between the first part 52 and the third part 60. The second part 65 is preferably formed with a width corresponding to the space. In this position, the first part 52 and the third part 60 are prevented from being moved laterally backwards. The second part 65 is finally fixed by means of the above-mentioned transverse pin, which is inserted through the holes 53, 61, 66 and is secured, e.g. by means of a nut. It should be stressed that the second part 65 may very well be fixed in another manner, e.g. by snapping on.

Although, as explained above, the invention primarily serves to provide a groove for retaining the mounting strip 8 at the inner corners of the freight container 1, it is clear that the groove connection device 50 may also be used for imparting increased strength to the frame 40 at the corners, and that, in this case, the groove 43 may merely be necessary in the area at the corners of the freight container 1. The groove 43 in the frame elements 41, 41' may also be provided with stops that prevent relative displacement of the locking device 50 relative to the frame elements. It is hereby possible to connect the frame elements 41, 41' solely because of the engagement between the locking hooks 54 and the locking flanges 45, 46.

C l a i m s

1. A freight container (1) having sides (10, 20) oriented perpendicularly to each other and defining an internal cargo space, and having a rectangular access opening which allows access to said cargo space, said access opening being surrounded by straight sections of a channel-shaped first groove (43), said sections being oriented perpendicularly to each other, said first groove (43) extending in a plane which is substantially parallel with the plane of the access opening, said freight container (1) having separate groove connection devices (50) with a groove (51) that has a cross-sectional shape corresponding to the groove (43), and which forms a continuously extending smooth transition between two adjoining sections of the groove (43), **characterised in that** the groove connection devices (50) comprise engagement means that are shaped complementarily to the groove (43) and adapted to provide a mechanical engagement with two adjoining sections of the groove (43).
2. A freight container according to the preceding claim, **characterised in that** the groove (43) is formed integrally with the sides (10,20).
3. A freight container according to any of the preceding claims, **characterised in that** the groove (51) forms a curved transition between said sections of the groove (43).
4. A freight container according to any one of the preceding claims, **characterised in that**, in cross-

section, the groove (43) has a locking flange (45) that defines an access passage to the groove (43); and

that the groove connection device (50) comprises:

5

a first part (52) adapted to be moved into the groove (43) through said access passage and laterally forwards to a locking position in which the first part (52) is in engagement with the locking flange (45),

10

a second part (65) which, in said locking position, is adapted to prevent removal of the first part (52) through the access passage, and

15 locking means to allow a preferably releasable retention of the second part (65) relative to the first groove in said locking position.

5. A freight container according to claim 4,
20 characterised in that the second part (65) is adapted to engage the first part (52) and a surface of the groove (43), respectively, in said locking position.

6. A freight container according to claim 4 or 5,
25 characterised in that the locking means are shaped as an elongated pin that extends through the first part (52) and the second part (65).

7. A freight container according to any one of preceding
30 claims 4-6, characterised in that the groove (43) has an additional locking flange (46), said access passage to the groove (43) extending between the first-mentioned locking flange (45) and the additional locking flange (46); and

that the groove connection device (50) comprises a third part (60) adapted to be moved into the groove (43) through said access passage and laterally forwards to a locking position in which the third part (60) is engaged
5 with a locking flange (46); and .

that said second part (65) is adapted to prevent removal of both the first part (52) and the third part (60) through the access passage in said locking position.

10

8. A freight container according to the preceding claim, characterised in that the first part (52) and the third part (60) comprise protruding locking hooks (54, 62) adapted to engage the locking flanges (45, 46) in said
15 locking position; and

that the second part (60) is adapted to retain the first part (52) and the third part (60) at a fixed mutual distance in said locking position.

20

9. A freight container according to any one of preceding claims 4-8, characterised in that the groove (43) is arranged near the access opening.

25 10. A freight container according to any one of preceding claims 4-8, wherein the access opening is surrounded by a separate frame (40) connected with at least one of said sides (10, 20), characterised in that the frame (40) carries the first groove (43).

30

11. A freight container according to the preceding claim, characterised in that the groove (43) is formed integrally with the frame (40) by extrusion.

12. A freight container according to any one of the preceding claims, characterised in that the groove connection device (50) is dimensioned to impart a substantial rigidity to the freight container (1) at the
5 connection between the sides (10, 20).

1/4

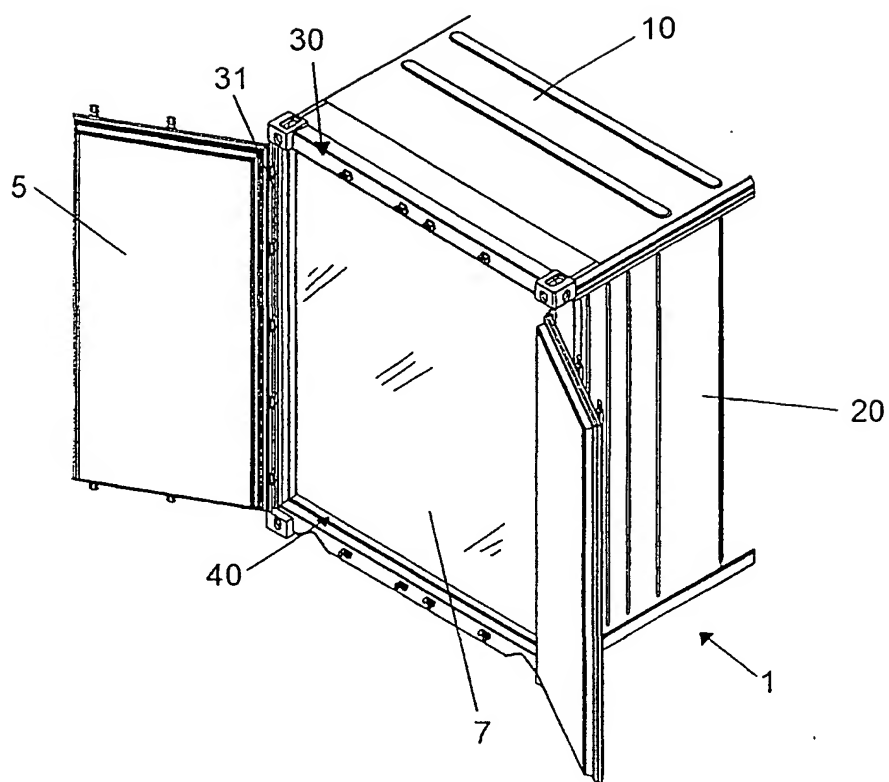


Fig. 1

2/4

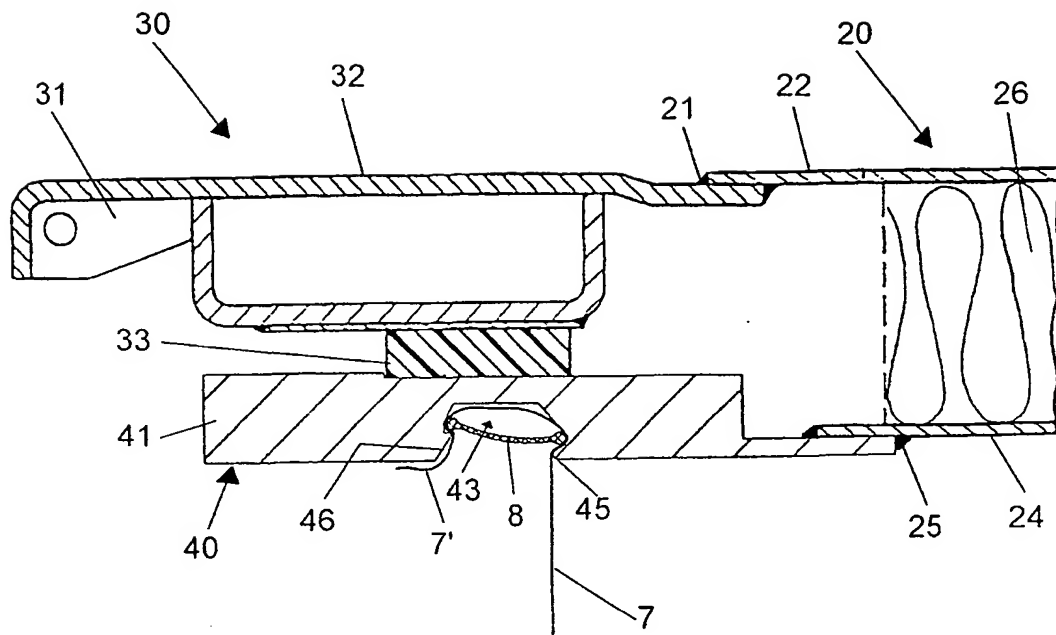
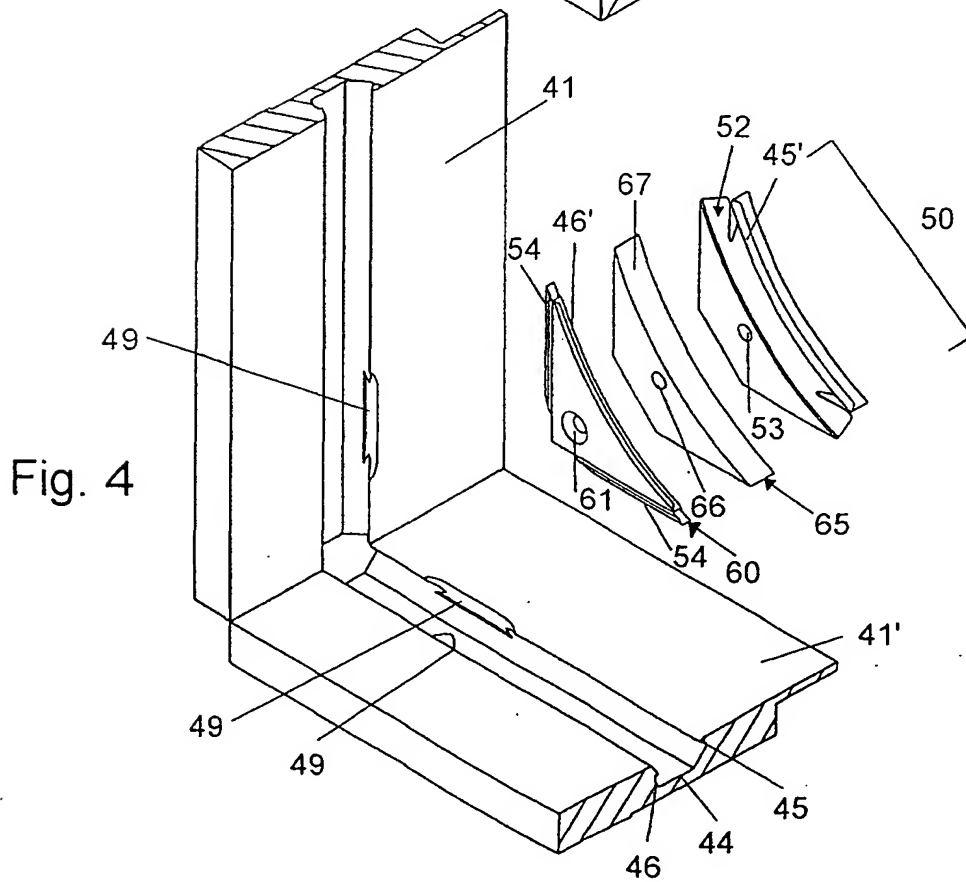
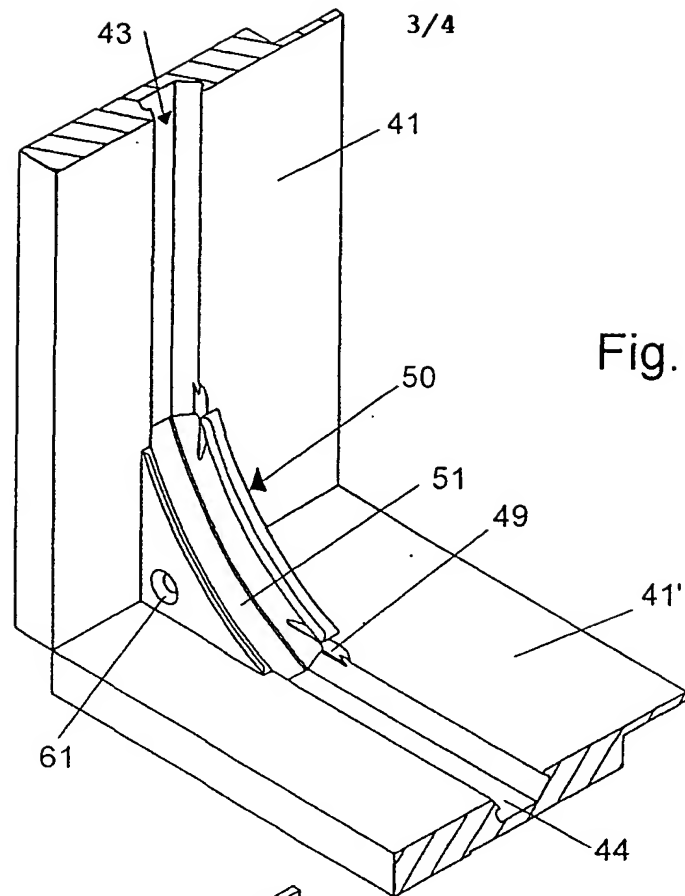


Fig. 2



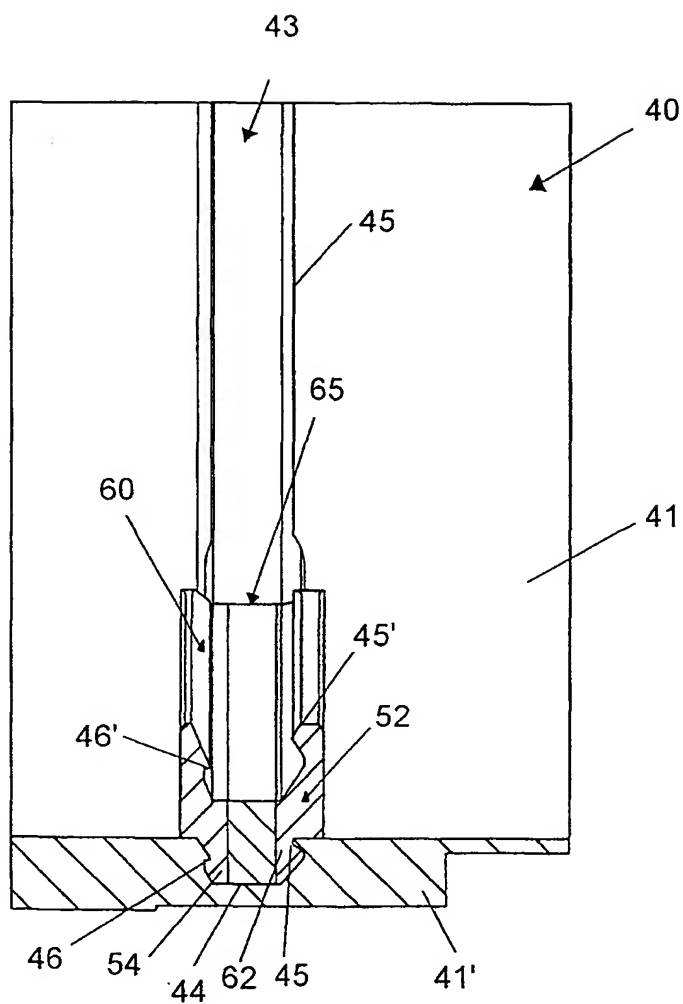


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 01/00620

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65D 88/14, B65D 90/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4429730 A (R W ELSTON), 7 February 1984 (07.02.84) --	1-12
A	US 5109998 A (BRETSCHNEIDER), 5 May 1992 (05.05.92) --	1-12
A	A 4212406 US (G MITTELMANN), 15 July 1980 (15.07.80) -- -----	1-12

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

14 December 2001

Date of mailing of the international search report

10 -01- 2002

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Inger Löfgren/EK

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT
Information on patent family members

06/11/01

International application No.
PCT/DK 01/00620

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
US	4429730	A	07/02/84	DE 3202750 A,C	02/09/82
				GB 2091695 A,B	04/08/82
				JP 1406300 C	27/10/87
				JP 57142885 A	03/09/82
				JP 62012105 B	17/03/87
				NO 154601 B,C	04/08/86
				NO 820243 A	29/07/82
				SG 53584 G	07/06/85
US	5109998	A	05/05/92	AT 79819 T	15/09/92
				AU 605593 B	17/01/91
				AU 1710288 A	06/12/88
				CA 1314008 A	02/03/93
				DE 3715895 A,C	01/12/88
				DE 3874081 A	01/10/92
				EP 0313601 A,B	03/05/89
				SE 0313601 T3	
A	4212406	US	15/07/80	WO 8808821 A	17/11/88
				NONE	